

REMARKS

Reconsideration of this application is respectfully requested.

Claims 1-17 are pending in the application.

In the Office Action, the Examiner rejected Claims 1-17 under 35 U.S.C. §103(a) as being unpatentable over Komatsuzaki et al. (U.S. Patent No. 6,534,593) in view of Diehl et al. (U.S. Patent No. 5,292,819). Specifically, the Examiner alleges that Komatsuzaki et al. discloses all the elements of independent Claims 1 and 5 except for polybutadiene block (pB) as a part of the specified hetero-branched block copolymer structure, which is allegedly taught in Diehl et al. However, it is respectfully submitted that the Examiner is incorrect.

As pointed out in the summary of the invention of the present application, the present invention is directed to a hetero-branched radial polystyrene-polyisoprene block copolymers having a structure having optimized heat stability and adhesion property, represented by a 4-branched radial polystyrene-polyisoprene block copolymer with one butadiene block, i.e., a 4-branched radial SIS comprised of three polystyrene-polyisoprene blocks and one polystyrene-polyisoprene-polybutadiene block. The claimed invention provides the improved method described in the summary of the invention of the present

application for preparing the hetero-branched polystyrene-polyisoprene radial block copolymer.

It is respectfully submitted that Komatsuzaki et al. merely discloses a poly(aromatic vinyl)/polyisoprene block copolymer composition comprising 1 to 34wt% by weight of diblock polymer represented by Formula 1 and referred to as component (a), 34 to 99 wt% by weight of four-branch polymer represented by the Formula 2 and referred to as component (b), and 0 to 50wt% by weight of at least one branched polymer selected from the group consisting of a two-branch polymer represented by the Formula 3 and a three-branch polymer represented by Formula 4, and preferred to as component (c); and a process for producing the above-identified poly(aromatic vinyl)/polyisoprene block copolymer with a coupling agent having functionality of 4. More particularly, the Examiner asserts that the poly(aromatic vinyl)/polyisoprene block copolymer composition of Komatsuzaki et al. contains 4-branch polymer represented by the Formula 2. Accordingly, Komatsuzaki et al. merely discloses that the block copolymer composition has a homogeneous block copolymer just comprising a poly(aromatic vinyl) block and polyisoprene block.

However, the present invention, as recited in independent Claim 1, teaches the structure of a hetero-branched radial block copolymer comprising a 3-branch block of polystyrene-polyisoprene block and 1-branch of polystyrene-polyisoprene-polybutadiene block. Accordingly, it is respectfully submitted that Komatsuzaki et al. fails to disclose

or suggest the block copolymer composition having the hetero-branched block structure of the present invention. Diehl does not cure the deficiencies of Komatsuzaki et al.

It is respectfully submitted that Diehl et al. merely discloses a radial block copolymer having the formula $(pS-pI)_nX$ or $(pS-pI-pB)_nX$. Diehl fails to disclose the hetero-branched block copolymer structure represented by $(pS-pI)_3X-(pB-pI-pS)$ of the present invention. In case of the $(pS-pI-pB)_nX$ formula of Diehl et al., it is necessary to contain the polybutadiene block at every branch. In contrast, the radial block copolymer of the present invention includes a 3-branched block copolymer of polystyrene-polyisoprene block and 1-branched block copolymer of polystyrene-polyisoprene-polybutadiene block. More particularly, the radial block copolymer of the present invention includes the 3-branched block copolymer without containing a butadiene block and 1-branched block copolymer containing butadiene block. Accordingly, Diehl et al. does not cure this deficiency of Komatsuzaki et al. Withdrawal of the rejection of Claim is respectfully requested.

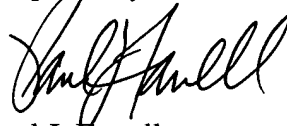
Regarding independent Claim 5, it is respectfully submitted that both Komatsuzaki et al. and Diehl et al. disclose merely the anionic living polymerization process to obtain the radial block copolymer. In contrast, it is submitted that the process for producing the hetero-branched radial block copolymer of the present invention, as recited in independent Claim 5, would be finished after adding a coupling agent and would produce a 4-branched radial block copolymer having butadiene block at every

block, though the butadiene monomer is added. However, in case of the process of the present invention, although it uses a SiCl_4 as a coupling agent and it changes a charge sequence of the coupling agent, the reaction would not be finished after adding coupling agent but further reaction would be performed by adding a butadiene monomer. More particularly, the added butadiene monomer reacts with unreacted polystyrene-polyisoprene-Li to form a tri block(pS-pI-pB-Li). And then, the tri block(pS-pI-pB-Li) reacts with one unreacted functional group of the 3-branched polymer through a secondary coupling reaction to form a hetero-branched radial block copolymer represented by the formula 1. Accordingly, even though the difference between the preparing method of the block copolymer having a $(\text{pS-pI-pB})_n\text{X}$ structure in Example 2 of Diehl et al. and the preparing method of the hetero-branched radial block copolymer of the present invention might seem to be a modification of the charge sequence of the coupling agent, it is submitted that the structures of the final radial block copolymers are different each other. Therefore, it is respectfully submitted that it would not be obvious to one of ordinary skill in the art to modify a process for producing a four-branched block copolymer in Komatsuzaki et al. such that at least one branch block has a structure of (pB-pI-pS) block of Diehl et al, and it is respectfully requested that the rejection of Claim 5 be withdrawn.

Without conceding the patentability per se of dependent Claims 2-4 and 6-17, these are likewise believed to be allowable by virtue of their dependence on their respective independent Claims 1 and 5.

Accordingly, all of the claims pending in the Application, namely, Claims 1-17, are believed to be in condition for allowance. Should the Examiner believe that a telephone conference or personal interview would facilitate resolution of any remaining matters, the Examiner may contact Applicants' attorney at the number given below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Paul J. Farrell", written over the typed name.

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